

FM on the HF bands

While the current licence privileges permit the use of FM transmission modes on all the HF bands, operators are cautioned that different bandwidth restrictions apply to the bands below 29 MHz, to what is permitted above that.

While voice FM operation on the VHF and UHF bands has been popular for 25 years, the mode employed has generally been so-called "wideband" FM (wideband to some, but narrow-band to VHF/UHF enthusiasts), with a nominal transmission bandwidth of 16 kHz, and identified in the licence specifications as 16K0F3E (for straight frequency modulation) and 16K0G3E (for phase modulation).

The present Technical Licence Specifications restrict the use of 16K0F or 16K0G modulation modes on bands below 30 MHz to the 29.0-29.7 MHz segment of the 10 metre band.

On the other HF bands, 6K00F or 6K00G modes ("narrow-band" FM) are permitted, but here lies a stumbling block – don't try to use your "store-bought" transceiver, it's unlikely to produce legal FM transmissions. This is no reflection on the transceiver manufacturers, who produce their rigs for world markets. The accompanying table tells the story.

Specifications for some 24 popular transceivers from the three main manufacturers have been compiled here (courtesy of Federal Technical Advisory Committee chairman, John Martin VK3KWA). Without making adjustments, at the very least, or at worst having to modify a rig, the occupied bandwidth of these rigs would be at least twice as great as the 6 kHz permitted below 29 MHz.

To get an idea of the transmitter's occupied bandwidth of a commercial rig featuring FM mode operation, look at the receiver filter bandwidth for FM reception. From the table you can see that, for many cases, this is 15 kHz at the -6 dB point; the narrowest are 8 kHz – still wider than the 6 kHz permitted in Australia.

But what about where the deviation is given as +/- 2.5 kHz? If you think this results in a transmission bandwidth of 5 kHz, go back to your amateur textbooks (pass in your licence, re-sit the exam...). The bandwidth of an FM transmission depends not only on the deviation, but the highest, modulating frequency and a factor called the modulation index.

The majority of commercial rigs, as the table shows, are specified for +/- 5 kHz deviation, some for +/- 2.5 kHz. Either way, as they are, they can't legally be used below 29 MHz.

A transceiver may be adjusted to

produce 6 kHz occupied bandwidth on FM. In FM mode, the mic gain control acts to set the audio level presented to the transmitter limiter circuit, but does not control the peak deviation; the deviation adjustment is

Transceiver Model	Max. deviation (kHz)	Receiver bandwidth (kHz) @ -6 dB	Receiver bandwidth (kHz) @ -60 dB
TS430	± 5	15	32
TS140, TS450, TS690, TS50	± 5	12	25
TS850, TS950	± 5	12	24
IC765, IC781	± 5	15	30
IC725, IC735	not specified	15	30
IC728, IC729, IC736, IC738	not specified	12	30
IC751	± 5	not specified	not specified
IC706 (normal FM)	not specified	>12	30
(narrow FM)	not specified	8	not specified
FT650 (normal FM)	± 5	15	30
(narrow FM)	± 2.5	8	30
FT747	± 2.5	8	19
FT757, FT767	± 5	15	30
FT890	± 2.5	not specified	not specified
FT990, FT1000	± 2.5	not specified	not specified

TS – Kenwood IC – Icom FT – Yaesu

FM mode specifications of popular HF transceivers

always an internal preset pot. But, you'd need the necessary test equipment (at least a deviation meter) to achieve the proper result.

However, assuming a 6 kHz transmitted bandwidth could be achieved, the result on reception is compromised because of the

wide receiver filter bandwidth which yields poor audio. Transmit and receive bandwidths need to be matched.

A rig specified for +/- 2.5 kHz deviation and an 8 kHz receive filter could have the deviation adjusted slightly to get the transmission bandwidth down to 6 kHz, and probably get acceptable results –

provided the rig on the other end had an 8 kHz receive filter. However, working anyone with a 15 kHz filter would bring reports of "inadequate deviation".

Experimenting with FM on the HF bands below 29 MHz is for the homebrew enthusiast or the amateur prepared to adjust or modify (and measure) his store-bought rig. You can't just flick to "FM" and conduct a contact.

John Martin reports hearing a station using FM on 3693 kHz, whose transmission bandwidth appeared to be on the order of 16 kHz wide (3684- 3702 kHz) – a double breach of the permitted conditions.

WIA Federal to embark on marketing campaign

At a meeting held in Melbourne over the weekend of 3-4 February, the Federal Council of the WIA heard a number of reports covering membership growth and retention, and advertising and marketing plans.

At its October meeting last year, the Federal Council adopted recommendations to form three Council working groups: Strategic Planning, Marketing and Advertising, and Membership Growth and Retention. To some extent, the operations of each working group impinge on the others, but the Council felt that this would help develop a cohesive, and better coordinated, approach.

Reports discussed by the Council at the February meeting, covered a variety of proposals for marketing amateur radio activity, membership of the WIA Divisions,

and the variety of services and activities conducted by both WIA Federal and the Divisions.

Proposals being considered include: boosting the 'visibility' of amateur radio in the community in various ways, membership cards, membership 'bonus' schemes and competitions, a special youth membership grade, changes to membership grades, promoting the WIA among computer enthusiasts and other technologically aware groups, etc.

The working groups are continuing to refine the proposals and to integrate already existing activities to better promote amateur radio and the Institute. As proposals are investigated and mature, the Council intends to introduce them at the earliest opportunity that each can be initiated. Keep a watch on WIA News.